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try experiments, and the tolerance which makes such experiments possible is the finest flower of the belief in positive freedom itself, the belief that individuals may thus create a new and better social order and that reasonable beings may be depended upon in the long run to hold fast to that which is good. Such freedom is consistent only with the view that social evolution is an epigenesis.

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HUMANISM AND SCIENCE

AN interesting application of a thoroughgoing humanism to the philosophy of science is to be found in the recent articles by Professor Warner Fite.[1] Holding that pragmatism has had commerce where it ought not to have had, and in its present generation and development shows a good deal of this unhappy hybridity, or, to seek a more exact figure, holding that pragmatism, after arguing with force for the instrumental character of all science, has fallen prey to this very instrument, the author points out the true path of regeneration, or, the liberator from this self-incurred restraint. Pragmatism, that is, especially the particular brand advertised as instrumentalism, has not gone far enough. On its mission of exhibiting the man-made character of all knowledge and especially the human value of mechanism as an instrument, it has been arrested and turned aside by the sign-post it has itself erected. I suppose the line of thought thus to be attributed to pragmatism is as follows: It insists upon the plasticity of scientific constructions by pointing out their human origin and uses; these human uses in turn are heavily emphasized, and the importance of our present scientific attainments is shown; lastly, these scientific constructions are looming up as so important that their original plasticity is forgotten and they are seen—behold!—as absolute. But intellectual midwifery is still an important part of the philosopher's work, and Professor Fite undertakes to help to their birth the true implications of humanism.

The categories of science, then, are taken as instruments. But the only needs to be satisfied by such instruments are those for bread and butter; and as a matter of fact, we are told, the pragmatist regards the bread-and-butter needs as the only needs. Whatever of the more spiritual or more intellectual or more social needs are to be admitted, they are dismissed shortly as only disguised forms of the essential and all-fundamental bread and butter needs. But such a position is shockingly of earth earthy to Professor Fite; and thus the

[1] *Philosophical Review*, Vol. XXIII., pages 410, 506.

lamentable handicapping of the pragmatist by his instrumentalism would seem to have extended even to his conception of human nature.

Hardly less serious is the result upon the pragmatist's epistemology—in spite of his aversion to the term, others insist upon using the word "epistemology" in connection with his doctrines. For the pragmatist any constructed theory of science is in the boldest sense *constructed*. It is a thing consciously invented and in no sense discovered; the interpretation is foisted upon nature, not read out of her. Thus the third count in the indictment we are following refers to the building up of a world outlook and scientific order faithful and impersonal by presumption, but arbitrary, capricious, and subjective in actuality.

The way of right instruction, to follow Professor Fite, is to be found incidentally by bridging the yawning chasm between the one-sided realistic emphasis upon the "hard outer fact" and the one-sided pragmatist emphasis upon the personal equation. Such an opposition between the two arises entirely from a preliminary assumption that if nature's phenomena are to have an independent status of their own it must be a cold and impersonal dignity. This arouses the excessive loyalty and enthusiasm of the one, and the excessive suspicion of the other. The one wants to put everything into terms of independent mechanism, the other tries to construe all as the arbitrary creation of the personal subject. But the key to the difference has already been hinted at: give up the notion of a "cold" nature in favor of that of a personal nature; realize that our knowledge of natural science is different in degree only, not in kind, from our knowledge of social fellow; and the difficulty rests no longer on solid basis.

I

Now before essaying remarks upon the latter constructive article, I can not resist the desire to notice points in the earlier articles of more critical nature. Professor Fite, as just noted, has indicted pragmatists, and especially those with the instrumentalist emphasis, on at least three counts. These may well occupy us a few minutes.

"Why does pragmatism take refuge in instrumentalism? This question brings to our attention the strange reverence of the instrumentalists for the point of view of modern science."[2] "The pragmatist demonstrates his regard for modern science by taking the mechanical view without criticism; and then he makes peace with himself by interpreting the mechanism as an instrument for the satisfaction of practical needs. The result is instrumentalism. By this compromise the path is closed to any further development of a humanistic logic. The very name means that the instrument, now once for

[2] *Ibid.*, page 424.

all accepted as such, stands as a barrier to any deeper or more human interpretation of our needs. In instrumentalism . . . thought and logic have congealed. . . . Instrumentalism is an unholy alliance with absolutism."[3]

It is rather disappointing that Professor Fite has not given us at any point in his criticisms explicit—or even more vague and general —references to the writings and portions of writings he happens to be criticizing. Such more definite references would have been doubly helpful to the reader: not only by giving him the clues for assisting, if so inclined, in tracking down each particular *bête noire*, but also by affording him additional keys to the critic's own position.

In the present case it is a little hard for me, at least, to understand exactly what is denoted by "the mechanical view" or "the mechanism." If it possibly refers to a mechanistic conception of the world order in the traditional sense of the term—which I suppose any one would hesitate to believe—the assertion of a predilection of the instrumentalist for this view seems to run dead against, and is even definitely denied by, Professor Dewey's words spoken in several places in favor of the evolutionary conception that "Reality is . . . dynamic and self-evolving" and "shows . . . tendency and purpose." "No account of the universe in terms *merely* of the redistribution of matter in motion is complete . . . for it ignores the cardinal fact that the character of matter in motion and of its redistribution is such as cumulatively to achieve ends—to effect the world of values we know."[4] Compare also Mr. Schiller's statement of naturalism as "valid enough and useful as a method of tracing the connections that permeate reality from the lowest to the highest level: but when taken as the last word on philosophy it subjects the human to the arbitrament of its inferior."[5] If Darwin's influence upon philosophy is that he freed the new logic of change and generation for application to mind and morals and life; if biology, psychology, and the social sciences point to rehabilitation of belief in a new kind of philosophy; and if this new logic, this new philosophy, is the one defended by the pragmatist, his "unholy alliance with absolutism" must indeed be a highly clandestine affair and one totally barren of offspring.

After all, it may be said, I am belaboring a man of straw. My answer is that I hope so. It is to be hoped, surely, that, however he may have expressed himself in words, Professor Fite had in mind as the pragmatist's fetish some conception of "modern science" not limited to a "mechanical view."

[3] *Ibid.*, pages 426–7.

[4] "Studies in Logical Theory," Preface, page X.; "Influence of Darwin," pages 8–9, 34, and all of title essay.

[5] "Humanism: Philosophical Essays," Preface, page XXIV.

Perhaps, then, the fault found with his opponent is that he takes his *biological* or *evolutionary* conception of the world with blind faith. "No amount of articulate coherence in the answer that nature makes to the evolutionist will prove that this is the only answer that nature has to give. . . . Nature might still reply with equal definiteness to some other hypothesis, not less comprehensive than the hypothesis of evolution, the meaning of which is beyond our power to grasp. . . . To claim that our human science is the only way is to commit the crass anthropomorphism of supposing that the powers of nature are limited to those of our human imagination."[6] The question here becomes not whether the critic's methodological conception of evolution as a tentative hypothesis is the correct one (which who would deny?), but rather whether the pragmatist-instrumentalist actually holds any other conception. Does the latter take the evolutionary account of nature as the final, the all-sufficient one? Again one is embarrassed by the absence of any cues, any references direct to points in pragmatist documents where the pernicious position is maintained. It is true, of course, that pragmatism is the most "biological" of latter-day philosophies, and that its emphasis upon the functional and purposive character of thought, with all the attendant emphases, is founded upon a voluntarism that in turn owes its origin largely to the evolutionary conception of life. But the question is: Is this evolutionary conception bolted without salt or seasoning?

I have just quoted one passage that, as much as any, appears to show Professor Fite's belief that it is so bolted. But in one of Professor James's works occurs a passage almost identical in meaning. "Were we lobsters, or bees, it might be that our organization would have led to our using quite different modes . . . of apprehending our experiences. It *might* be, too . . . that such categories, unimaginable by us to-day, would have proved on the whole as serviceable for handling our experiences mentally as those which we actually use."[7] And if Professor James is not to be singled out, according to our author, as an instrumentalist (he is not always specific in naming those to be pilloried for the public scorn), then note the passages of Professor Dewey's in which he puts the question "whether the scientific formula as such or the direct, vital experience as such is, for the philosopher, a better index of the nature of reality." It is expressly given as his "contention that a direct experience is a better index for philosophy than the knowledge phase as such of an experience," "that an experience in which a symbol is experienced in its fulfilment or embodiment, is better than one in which the symbol

[6] *Ibid.*, page 523.

[7] "Pragmatism," page 171.

alone is experienced." The "veriest unenlightened ditch-digger" has a truer and more genuine conception of reality than any scientific formulation—evolutionary or otherwise.[8] Surely, to the pragmatist, if "theories thus become instruments ["mental modes of adaptation to reality"], not answers to enigmas, in which we can rest," then "pragmatism unstiffens all our theories, limbers them up and sets each one at work"; and science as well as common sense and philosophy must "seem insufficiently true in some regard and leave some dissatisfaction."[9]

Another accusation of the pragmatist offered by Professor Fite is less ambiguous, and yet (or, therefore), is more surprising and even puzzling. "For the pragmatists the Copernican theory would be, not a discovery, but an invention . . . a theory of the heavens would be regarded as one of the necessities . . . of navigation. The older Ptolemaic theory . . . [was] no longer available . . . and the Copernican theory was devised to take its place." Thus the pragmatist "lays himself justly open to the charge of creating a subjective and fictitious world by speaking constantly as if an invention were invented out of nothing." Further, the pragmatist says "that any unwelcome experience he will decline to treat as a fact. But this only means . . . that the distinction between truth and fiction is thoroughly artificial and capricious."[10]

Can this be the reappearance of that apparation—better, hallucination—believed to have been some time since laid? The past discussions of this point and its seemingly sufficient refutation would almost warrant an ignoring of the topic; but having come back in at the window, let it be put out at the window. One almost wonders why Professor Fite has not used again another argument that is in certain ways very similar: I refer to the "solipsism" of pragmatism. And yet at times he seems to imply this, too, though hardly with a challenging explicitness. To my own mind, one of the clearest and most direct refutations of the above stricture on the pragmatist or humanist is to be found in Mr. Schiller's chapters on "The Making of Truth" and "The Making of Reality."[11] It is interesting to note this writer's distinction between "primary" and "real" reality. "Primary" reality may "in a sense be called 'independent' of us . . . for it is certainly not 'made' by us, but 'found.' But, as it stands, we find it most unsatisfactory and set to work to remake it . . . as immediately experienced, it is a meaningless chaos, merely the raw

[8] "Pure Experience and Reality," *Philosophical Review*, Vol. XVI., page 419; also "Reality as Experience," This JOURNAL, Vol. III., pages 253–7; and "Influence of Darwin," pages 182–4, 191–2.

[9] James, *op. cit.*, pages 53, 190, 192, 194.

[10] *Op. cit.*, pages 413, 418, 428–9.

[11] "Studies in Humanism," Chaps. VII. and XIX.

material of a cosmos." "Real" fact is made from "primary" fact by selection and valuation, which segregates real from apparent. The implication here is that the making of reality is not creation *ex nihilo*. Further, it is not capricious, is not whatever the subject pleases. That nature "is utterly plastic to our every demand" is only "a travesty of Pragmatism." Experience is, however, confused and blurred and meaningless until the motor dispositions of the subject by their selective functioning introduce some principles of order and meaning into the whole, with subsequent distinctions of true and false. Thus "the nature of things is not determinate, but determinable."[12]

Professor James makes a statement also meeting the issue squarely. "We all three ["Dewey, Schiller, and myself"] absolutely agree in admitting the transcendency of the object (provided it be an experiencable object) to the subject, in the truth relation. . . . His [Dewey's] account of knowledge is not only absurd, but meaningless, unless independent existences be there of which our ideas take account and for the transformation of which they work."[13]

This "transcendency of the object," now, though less explicitly set forth, perhaps, may be considered as one of the incidental contentions of an important series of articles by Professor Dewey.[14] In any experience where thought is awakened, "the presented facts are brutely, unquestionably, stubbornly, there, but they present themselves as *not* the whole and genuine reality." But this "transcendence," it must be noted, is not an epistemological, only a logical transcendence; that is, "the emergence of this duality [of self and world] is within the conflicting and strained situation of action."[15] The fundamental point, so far as we are here concerned, remains the same, namely, the question whether a new theory is to pragmatism "an invention out of nothing," and whether "the distinction between truth and fiction is thoroughly artificial and capricious." This qualification of duality, it need hardly be said, involves no recognition of its arbitrariness; its relativity to the experiential situation with its manifold of striving life with its helps and hindrances and neutrals, makes it relative to *that manifold*, not a pure invention. And if to arrive at a truth, the central agent of the situation of action must needs survey and experiment with his situation, the truth becomes *ipso facto* anything but artificial and capricious.

I can not understand Professor Fite's extreme position in his

[12] "Humanism: Philosophical Essays," footnote, page 12.

[13] "Meaning of Truth," pages xvi–xvii of Preface.

[14] "The Control of Ideas by Facts," This JOURNAL, Vol. IV., pages 197, 253, 309.

[15] *Ibid.*, pages 255, 310. Cf. also James: "Essays in Radical Empiricism," pages 52, 53, 57.

said, too, that we are no more certain of the enduring quality of moral hypotheses than we are of that of scientific hypotheses; both are liable to absolute error; the enthusiastic rights of one generation may be Utopian fancies to the next.

Nevertheless, there is in actuality some objective validation of rights. Putatively, ends may be as many as there are individuals in the world; actually, no such anarchy is the case. It is means rather than ends that commonly vary, instrumental rather than final goods; all men desire Fortune, but the modes of wooing her are as many as there are men. If we ignore eccentricities in moral science as we do in physical science, the number of rights which men actually recognize will be found to be surprisingly few: a simple Declaration will sum them up for a group of centuries.

Laws and institutions are the reflections of such hypothetical rights in historical human societies. Human laws do not state procedures, as do natural laws, but purposes—such purposes as have become, as it were, phenomenally realized. Sometimes a law may outlast its realization, and survive as a form or rote which is socially dead; and this chance is no doubt the source of the legalist's reputation for dry-as-dust conservatism; but the essential function of the laws of a state is to *express the norm of progress,* as conceived in its day and generation.

Thus laws, which are the forms of the administration of justice, rest upon rights, which are the theoretic aims of justice; and law and right and justice are all subsumptions of that general faith in progress which is to moral science what faith in uniformity is to natural science. Corollary to this: there is a hierarchy of rights being defined by the course of history, which leads logically to an essential right as the theoretic end of progress; and similarly, there is a hierarchy of laws expressing the structure of social evolution, and leading (for the mind shrewd enough to discover it) to some law of progress as universal as is the law of gravitation. The business of the legal historian is to reconstruct the desires which underlie the laws of the past; the business of the legal philosopher is to divine the attainable good which will satisfy man's instinct for progress; while the business of the judge is to weigh contemporary hypotheses of right in the light of past desire and attainable good, and pronounce upon their moral truth or falsity.

Can we define justice in a more individual sense, as what is due to this man or that? Clearly, it is *the individual's equity in human progress.* The formula may seem vague, but I think that it should not be found unfruitful either as a principle of law or a maxim of legislation. At least it points out that justice belongs primarily to man's theoretic nature, that it must find its satisfactions, not in the

in the cold isolation traditionally imputed to it is admitted by Professor Fite himself. Ceremoniously ushered out the front door, the practical reason has been (unconsciously) admitted by the rear. After asking "how a conception can really be more convenient except as it renders the object more intelligible," a paragraph or two later he adds, "and renders it intelligible, we may go on to say, from the standpoint of our human motives for action."[21]

That the instrumentalists have overlooked or denied the social character of our needs will seem on the face of it as much to be challenged as the other changes. As a matter of fact, the two instrumentalists explicitly mentioned by Professor Fite are of all the pragmatists, so far as I know, the most clear-spoken and insistent in expounding the social character of all mental life.[22] There is, however, a wide difference here between the positions of Professor Fite and of these writers. While the former argues for the human-fellowship feeling at bottom of the knower's relation to the known or nature, the latter employ the term "social" to refer to the character of the knowing agent. For the former, all cognition is a social relation of some sort *between* two fellows; for the latter, it is a relation of public (and hence not subcutaneous and private) attention toward a more or less objectified subject-matter, this attention participated in by the component "individuals." This is speaking by and large. The instrumentalists at times may come very near to Professor Fite's conception. Professor Dewey says in one place: "The common statement that primitive man projects his own volitions, emotions, etc., into objects is but a back-handed way of expressing the truth that 'objects,' etc., have only gradually emerged from their life-matrix."[23] But the distinctly *human fellow* character of the known is not formulated.

If I may make bold to say so, I think that instead of denying to the instrumentalists any recognition of the social character of knowledge, it would seem to have been preferable for Professor Fite to have made the above concessions and thereupon to have drawn the distinction as the basis for his own contribution.

In passing now to the more constructive work I can not escape the feeling that the long array of marshaled quotations now behind us calls for apology. If I have one it is only that the assertions of Professor Fite have been given us with such a lack of cues as to the exact whereabouts of his opponents, that in reading his surprising attacks I for one felt for a moment a bit at sea. Obviously, categorical state-

[21] *Op. cit.*, pages 419, 420.

[22] *Cf.* especially Moore, *op. cit.*, all of chapters, "Pragmatism and Solipsism" and "Social Character of Habit and Attention."

[23] "Studies in Logical Theory," footnote, page 49.

ment is most easily and economically met by direct counter-statement, but texts selected as fairly as possible from the authors discussed have their own validity and value. I hope observed sins of omission have not led me into too flagrant sins of commission.

II

The particular contribution of Professor Fite we find suggested fragmentarily in the first paper and developed more positively in the second.

The notion of a "cold" nature must be given up in favor of the notion of a personal nature; we are to realize that our knowledge of natural science is different in degree only, not in kind, from our knowledge of social fellow. Salute your world, give its varying details the consideration you give your personal friend, look for *motives* back of its behavior toward you after the fashion of motives in your own conduct, and no longer will you feel called upon to explain any gulf between its behavior and your own knowledge thereof. Or, to put it more accurately: view the scientist's "conversation" and "bargaining" with his objects as similar to the layman's "experimentation" in learning an acceptable hour for dinner or luncheon with his friend, and the personal, social form of intercourse is seen to be the type of all knowledge. What has become of the much-vaunted—or much-rejected—"independence" of the object? The object enjoys independence just as much as, but no more than, the social fellow. It, too, has its own motives and types of behavior that have to be learned by the knower; it, too, never gives solid, cold rebuff, but always a refusal qualified and suggestive and it, too, is quite responsive upon correct interpretation and approach.

Here, then, if I understand Professor Fite, is the spirit of pragmatism read into implications leading beyond the place where instrumentalism has halted it. A larger humanism such as this reads the world in terms of personality, but personality on the world's own part; it is not only object of, but is possessor of motives more or less of the human type. "A fact is a function of the object's being known," and it is known when it and the knower have come to a mutual relation of "agreement" and "reciprocity." (It would be interesting if Professor Fite were to go further by indicating what ontological implications, if any, are to be drawn. Is nature actually constituted as the scientist methodologically considers it? If so, are these motives—granted that the point can not be definitely ascertained and proved—to be assumed existentially as attributes of personality in the human sense? And if so, is this to be conceived of as innumerable personality-fragments, as individual personalities, or

as an infinite personality? Or, after all, is the doctrine to be taken wholly as methodological and not at all as metaphysical?)

The view set forth is likely to strike a responsive chord in many a breast—speaking, of course, of strictly philosophical attitude, not of possible religious implications. Such responsiveness would be due, I suppose, largely to the feeling on many hands that the method of science has been carried too far by being viewed too blindly and submissively. At the present time we see in many places one of those rhythmic swings back from the over-formal, the over-intellectual, to the lively immediate, the warmly human. We have been taught that natural science is a perfectly detached, disinterested, cold registration of hard facts, gratifying a certain love of truth for truth's sake, and, as it merely happens, incidentally yielding fruits found by the technologist to be of value for human living. Human nature, however, is not accustomed to submit long to a libelling of its character; and in the present case it may be rather vulgarly figured as regarding a pseudo-portrait of itself with the remark, "Do I look like that!" The swing back by the merely humans from this extreme conception of the relation of man and nature is then the movement in which Professor Fite is sharing.

The history of human thinking in the large shows a pendulous oscillation between extremes, but this mere fact instead of justifying, rather cautions against, our own extreme habits of reaction. And I think Professor Fite's position amounts to an excessive movement of reverse. Instead of considering nature as dead and cold, the scientist actually treats it as a reciprocating personality (or personalities) to be considered in terms of its motives. The important thing, we are frequently told, is the *motive*. "The aim of science is not merely to find in nature an opaque and unintelligible instrument, still less to record a set of positive and absolute facts, but rather to discover in nature an activity intelligibly motived in like fashion with her own." "Newton's law simply reads into the universe that aspect of motive which makes our own action intelligible."[24] Anthropomorphism is actually and professedly embraced as part of the scientific method.

My inquiry at once is this: *does the scientist behave towards the world's activities as activities guided by human, or sub-human, motives?* The *first* subdivision of this inquiry is the question: What *initiates* the scientific investigation, calls it into being, starts it off? Is the investigation opened by an introjective act that imputes a human nature sort of guidance back of or within the overt activity?

The direct personal appeal of nature to sense and feeling is the inspiration of innumerable souls. The caress of a peaceful scene, of a

[24] *Op. cit.*, pages 420–21.

balmy atmosphere, of a well-ordered and harmonious landscape, may awaken a song in the heart, and may prompt to acts of self-expression of highest artistic value. Such inspiration, however, belongs to the province of esthetics, not to that of science; and the various languages which nature speaks to him who holds communion with her visible forms is language translatable only into verse, pigment, harmonies. So long as the relation remains on this level of appeal, the human response is in terms of passive absorption, of appreciative repose; and the interest of the contemplator is in perpetuating or deepening the ecstatic moment. But let nature once reveal herself as even slightly subject to manipulation, the least bit artificially modifiable in her changing phases, and man has come to himself, has learned that he has a mind. With this new interest—the interest in control leading to use—we have Man the Manipulator, and with the increasingly precise determination of the exact limits to this power we have Man the Scientist.

That the esthetic interest enters into the scientific spirit is, of course, evidenced in many ways, in system building, in much mathematical work, etc.; but it serves principally to fill in lacunæ, to put that finished completeness into the concepts developed, or to hold the investigator absorbed in his problem while the ultimate end falls temporarily into the background. In truly scientific work, it is always a motive incidental and complementary to the active and practical interests.

Professor Fite's use of the term "motive" is not explicitly clear. The term is commonly given two uses, as a conscious psychical element determining action, and as an envisaged end to action, both uses connoting the character of purpose. For Professor Fite, then, I take it, nature as object of true scientific method is really a nature manifesting purpose or purposes, and these purposes are more or less of the human type. Now, unless I am wholly wrong, this conception of the world implies a recognition of some sort of mind (taken in as wide a sense as you please), some form of reciprocating will at bottom of each phenomenon or set of phenomena of nature. The point is, of course, that this reciprocating will is explicitly or implicitly *recognized* by the investigator, that he treats any set of phenomena in question in the light of what would occur if he himself were at their heart and directing them.

Now, the difficulty in such a theory would seem to be traceable to an inadequate analysis of every-day experience. As a matter of fact, we do not naturally know and feel the world over against us after the fashion of an hylozoistic demonology. We may lose temper at bumping the head in the dark, or feel a weird sense of potency in certain lucky combinations, or grow exasperated at the endless flopping of

the window-shade; but in all such cases there is no true recognition of, or feeling toward, a hidden power acting through intentions and motives. True, we become angry or exhibit some other attitude considered strictly social in character, but this attitude is more akin to mechanical reflexes than to conscious replies. In other words, we fail in such incidents to abstract sufficiently from the vague irritatingness or the somehow-or-other potency of the object present; yet we do not go so far as to *read into* the object another will after the fashion of our own. To awaken the simple and more reflexive emotional attitudes does not require recognition of an agent acting with conscious purpose or with motive; and it is only the vague suggestion of further unascertained power in the object that constitutes the situation we are considering.

Exactly this would appear to be the type of situation in which the scientific interest is generated. Not in the sense of the "other" as being a somehow organized set of motives, a fellow, is the stimulus to experimentation; but the sense of an agency manifested in more or less vague and unmeasured forms of dynamic activity that have reference to us. The answer to the first question, then, is that what initiates the scientific investigation is not a recognition of motives in the natural world conceived after the manner of human purposes, but is a vivid sense of powers for good or ill manifested as yet uncertainly by the more or less mysterious object.

A *second* question follows naturally upon the first: Once under way, what conception of nature is constantly assumed implicitly or explicitly in scientific procedure?

Ostensibly, of course, the scientist as such assumes a detached and disinterested attitude toward his subject-matter. That such disinterested interest is through and through just this, is, however, plainly untrue. Just as the so-called instinct of curiosity may perhaps be described as instability between the competitive instincts of approach and of withdrawal, so in any scientific research there may be found by deeper analysis to be always something in the balance. The investigator may be commendably painstaking and "impersonal" in his observation and recording of successive phenomena, but this study is certainly taking him somewhere, is going to decide something or other, and this is connected up, however remotely, with his and others' systems of values.

The theory of the scientist's investigation of nature as modeled on the social man's tactful investigation of his friend's wishes, advanced by Professor Fite, brings out well the interaction character here involved. One may not attempt too brusquely to handle his nature or his friend, nor presume too hurriedly in his estimate of what this "other" may do in given cases. On the other hand, one is usually

not to be content with waiting, watching, and listening. Tentative stimuli or proposals must be advanced from time to time, letting the response in each case sharpen and define more clearly the stimulus or proposal next to be advanced, until at last the investigator has his object fairly well sized up. The interaction character present in experimentation with nature is thus well shown.

We may ask, however, as to the exact character of the beings between which this interaction takes place. Does the subject or observer regard his subject-matter as actuated by *motives,* which motives after due experimentation he learns to read off? If so, then the finished conception of the object, after it has become scientifically "understood," should be in terms of the object's purposes, its own why's and wherefore's. For of such is our satisfactory understanding of a given human fellow. It will be seen at once, however, that the peculiar intent of the thing, the "inside" reason and purpose of its behaving in the observed manner, is what the scientist least claims to have worked out. Electricity may be viewed by the physicist as a fellow, if you will, but it is most certainly not a fellow whose "reasons" we may understand as we do those of our human fellows. And the difference goes back ultimately to the fact that the motives of human nature (and animal nature in general) are crystallized or sublimated forms of animal instinct—protoplasmic impulsions that find no echo nor parallel in the behavior of the inorganic. The inanimate simply is not to be and can not be understood in these terms. We learn by dear experience how the inorganic operates, but the experience is dear just because these phenomena know not the control and guidance of human-like motives.

In a word, if the scientist as scientist faithfully renounces for the nonce any other missions—poetic, religious, or what not—and dutifully keeps himself a man of pure natural science, he finds his problems occurring not in terms of a nature seemingly possessed of motives or intents, but a nature only indefinitely and uncertainly beneficial or unbeneficial and hence with centers of action for weal or woe that are yet to be accurately located and measured before he may proceed to control them for his own ends. And once this task is well begun, it grows increasingly evident that this nature of his was mysterious and wonderful just because it refused to be understood in terms of motives.

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